

## An annotated checklist of the Chinese Mecoptera with description of male *Panorpa guttata* Navás, 1908

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**Abstract:** A checklist of 280 species of the Chinese Mecoptera is presented, including 49 species in Bittacidae, 228 species in Panorpidae, and three species in Panorpodidae. Four species, *Bicaubittacus burmanus* (Tjeder, 1973), *Bittacus monastyrskiyi* Bicha, 2007, *Neopanorpa cuspidata* Byers, 1965 and *N. nielseni* Byers, 1965, are reported from China for the first time. *Neopanorpa chaohsiufui* nom. nov. is proposed for *N. chaoi* Zhou, 2003, a junior homonym of *N. chaoi* Cheng, 1957. In addition, we describe and illustrate the male of *Panorpa guttata* Navás, 1908 for the first time in this paper.

**Key words:** Panorpidae; Bittacidae; Panorpodidae; new record

### 中国长翅目名录附滴蝎蛉 *Panorpa guttata* Navás, 1908 雄性描述

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**摘要:** 提供了中国长翅目 Mecoptera 280 种昆虫的名录, 包括蚊蝎蛉科 Bittacidae 49 种, 蝎蛉科 Panorpidae 228 种, 拟蝎蛉科 Panorpodidae 3 种。缅甸双尾蚊蝎蛉 *Bicaubittacus burmanus* (Tjeder, 1973), 莫氏蚊蝎蛉 *Bittacus monastyrskiyi* Bicha, 2007, 尖齿新蝎蛉 *Neopanorpa cuspidata* Byers, 1965 以及尼尔森新蝎蛉 *Neopanorpa nielseni* Byers, 1965 为中国新纪录种。赵氏新蝎蛉 *Neopanorpa chaohsiufui* nom. nov. 为 *N. chaoi* Zhou, 2003 的新名, 后者为 *N. chaoi* Cheng, 1957 的次同名。此外, 首次对滴蝎蛉 *Panorpa guttata* Navás, 1908 雄性进行了描述和图示。

**关键词:** 蝎蛉科; 蚊蝎蛉科; 拟蝎蛉科; 新纪录

### Introduction

Mecoptera, one of the basic lineages among holometabolous insects, comprise over 650 described extant species in nine families worldwide (Penny & Byers 1979; Bicha 2010). Three families have been recorded from China hitherto (Zhong *et al.* 2011; Chen *et al.* 2013; Zhong & Hua 2013; Gao *et al.* 2016; Wang & Hua 2017). Bittacidae are commonly called hangingflies, for their adults suspend themselves using prehensile front tarsi at repose. Panorpidae are recognized by enlarged and recurved genitalia in males like the stinger of scorpions, and commonly called scorpionflies. Panorpodidae, the short-faced scorpionflies, can be differentiated from Panorpidae by relatively shorter rostrum and abdomen (Hua 2004; Tan & Hua 2008c; Zhong *et al.* 2011).

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In this paper, we list 280 species in ten genera and three families of Mecoptera recorded from China, including 49 species in Bittacidae, 228 species in Panorpidae, and three species in Panorpodidae. Four species, *Bicaubittacus burmanus* (Tjeder, 1973), *Bittacus monastyrskiyi* Bicha, 2007, *Neopanorpa cuspidata* Byers, 1965 and *N. nielseni* Byers, 1965, are recorded from China for the first time. A new name, *Neopanorpa chaohsiufui* **nom. nov.**, is proposed for *N. chaoi* Zhou, 2003, a junior homonym of *N. chaoi* Cheng, 1957. In addition, we describe and illustrate the male of *Panorpa guttata* Navás, 1908 for the first time based on new materials from China.

## Material and Methods

Specimens examined in this study are deposited in the Entomological Museum, Northwest A&F University (NWAU) and the Institute of Zoology, Chinese Academy of Sciences (IZAS), respectively.

Measurements of right wings of 20 males and 20 females were made with a vernier calliper and presented as mean  $\pm$  SD (standard deviation). Photographs were taken with a Nikon D7000 digital camera, and further treated with Adobe Photoshop CS4.

## Taxonomy

### Checklist of Mecoptera from China

#### Family Bittacidae

##### *Bicaubittacus* Tan & Hua, 2009

- Bicaubittacus appendiculatus* (Esben-Petersen, 1927) (Yunnan)
- Bicaubittacus burmanus* (Tjeder, 1973), **new record to China** (Yunnan; Myanmar)
- Bicaubittacus longiprocessus* (Huang & Hua, 2005) (Fujian, Jiangxi)
- Bicaubittacus mengyangicus* Tan & Hua, 2009 (Yunnan)
- Bicaubittacus yangi* Tan & Hua, 2009 (Guangxi)

##### *Bittacus* Latreille, 1805

- Bittacus bifurcatus* Hua & Tan in Hua *et al.*, 2008 (Shaanxi)
- Bittacus carpenteri* Cheng, 1957 (Sichuan)
- Bittacus choui* Hua & Tan, 2007 (Shaanxi, Hubei, Sichuan, Chongqing)
- Bittacus chujoi* Issiki & Cheng, 1947 (Taiwan)
- Bittacus cirratus* Tjeder, 1956 (Jiangsu, Zhejiang, Jiangxi, Shaanxi, Jilin, Heilongjiang)  
syn. *Bittacus zoensis* Cheng, 1957, synonymized by Byers, 1970
- Bittacus contumax* Tjeder, 1956 (Shanghai, Jiangsu)
- Bittacus coreanus* Issiki, 1929 (Liaoning, Shanghai; North Korea)
- Bittacus dashahensis* Zhou & Zhou, 2005 (Guizhou)
- Bittacus diaoluoshanus* Chen & Hua, 2011 (Hainan)
- Bittacus falcatus* Zhou & Zhou, 2007 (Guizhou)
- Bittacus flavidus* Huang & Hua, 2005 (Shaanxi)
- Bittacus formosanus* Issiki, 1927 (Taiwan)
- Bittacus gressitti* Cheng, 1957 (Guangdong)
- Bittacus hainanicus* Tan & Hua, 2008 (Hainan)

- Bittacus jiulianshanus* Chen, Tan & Hua, 2013 (Jiangxi)  
*Bittacus kuankuoshuensis* Zhou & Zhou, 2012 (Guizhou)  
*Bittacus lii* Zhou, 2003 (Guizhou)  
*Bittacus longantennatus* Chen, Tan & Hua, 2013 (Sichuan)  
*Bittacus maculatus* Issiki, 1927 (Taiwan)  
*Bittacus monastyrskiyi* Bicha, 2007, **new record to China** (Guangxi; Vietnam)  
*Bittacus obscurus* Huang & Hua, 2005 (Shaanxi, Henan, Hubei)  
*Bittacus pieli* Navás, 1935 (Jiangxi, Anhui, Zhejiang)  
*Bittacus planus* Cheng, 1949 (Shaanxi, Henan)  
*Bittacus puripennis* Cai & Hua, 2006 (Shaanxi, Sichuan)  
*Bittacus setigerus* Chen, Tan & Hua, 2013 (Hubei, Guizhou)  
*Bittacus sinensis* Walker, 1853 (Heilongjiang, Jiangsu, Liaoning, Shaanxi, Zhejiang)  
syn. *Bittacus quaternipunctatus* Enderlein, 1910, synonymized by Esben-Petersen, 1921  
syn. *Bittacus strategus* Navás, 1913, synonymized by Esben-Petersen, 1921  
*Bittacus sinicus* Issiki, 1931 (Sichuan, Guizhou, Hubei, Shaanxi)  
*Bittacus sonani* Issiki, 1929 (Taiwan)  
*Bittacus stigmosus* Zhou & Zhou, 2005 (Guizhou)  
*Bittacus striatus* Issiki, 1927 (Taiwan)  
*Bittacus strigatus* Hua & Chou, 1998 (Henan, Shaanxi, Hubei)  
*Bittacus tienmushana* Cheng, 1957 (Zhejiang)  
*Bittacus trapezoideus* Huang & Hua, 2005 (Shaanxi, Gansu)  
*Bittacus triangularis* Issiki, 1929 (Shenyang, Liaoning)  
*Bittacus ussuriensis* Plutenko, 1985 (Liaoning, Jilin; Russia)  
*Bittacus vexilliferus* Byers, 1970 (Sichuan)  
*Bittacus wui* Zhou, 2001 (Zhejiang)  
*Bittacus zhejiangicus* Tan & Hua, 2008 (Zhejiang)  
*Terrobittacus* Tan & Hua, 2009  
*Terrobittacus angustus* Du & Hua, 2017 (Yunnan)  
*Terrobittacus echinatus* (Hua & Huang in Hua *et al.*, 2008) (Henan, Shaanxi, Fujian)  
*Terrobittacus implicatus* (Huang & Hua in Cai *et al.*, 2006) (Shaanxi)  
*Terrobittacus longisetus* Tan & Hua, 2009 (Hunan)  
*Terrobittacus xiphicus* Tan & Hua, 2009 (Guizhou, Hunan)  
*Terrobittacus rostratus* Du & Hua, 2017 (Yunnan)

### Family Panorpidae

*Cerapanorpa* Gao, Ma & Hua, 2016

- Cerapanorpa acutipennis* (Hua, 1998) (Liaoning, Jilin)  
*Cerapanorpa bicornifera* (Chou & Wang in Chou *et al.*, 1981) (Shaanxi)  
*Cerapanorpa bonis* (Cheng, 1949) (Gansu)  
*Cerapanorpa brevicornis* (Hua & Li in Li *et al.*, 2007) (Shaanxi, Hubei)  
*Cerapanorpa byersi* (Hua & Huang in Li *et al.*, 2007) (Shaanxi)  
*Cerapanorpa centralis* (Tjeder, 1936) (Sichuan)  
*Cerapanorpa dubia* (Chou & Wang in Chou *et al.*, 1981) (Shaanxi, Gansu, Henan)

- Cerapanorpa emarginata* (Cheng, 1949) (Shaanxi, Hubei, Ningxia)  
*Cerapanorpa funiushana* (Hua & Chou, 1997) (Henan)  
*Cerapanorpa horiensis* (Issiki, 1929) (Taiwan)  
*Cerapanorpa liupanshana* Gao, Ma & Hua, 2016 (Ningxia)  
*Cerapanorpa nanwutaina* (Chou in Chou *et al.*, 1981) (Shaanxi, Gansu)  
*Cerapanorpa obtusa* (Cheng, 1949) (Shaanxi, Gansu, Ningxia)  
     syn. *Panorpa leei* Cheng, 1949, synonymized by Ma *et al.*, 2014  
     syn. *Panorpa alticola* Zhou, 2000, synonymized by Gao *et al.*, 2016  
*Cerapanorpa protrudens* Gao, Ma & Hua, 2016 (Shaanxi)  
*Cerapanorpa reni* (Chou in Chou *et al.*, 1981) (Shaanxi)  
*Cerapanorpa sinuata* Gao, Ma & Hua, 2016 (Shaanxi)  
*Cerapanorpa wangwushana* (Huang, Hua & Shen, 2004) (Henan, Shanxi)  
*Dicerapanorpa* Zhong & Hua, 2013  
     *Dicerapanorpa baiyunshana* Zhong & Hua, 2013 (Henan)  
     *Dicerapanorpa diceris* (MacLachlan, 1894) (Sichuan)  
         syn. *Panorpa grahami* Carpenter, 1938, synonymized by Carpenter, 1948  
     *Dicerapanorpa kimminsi* (Carpenter, 1948) (Sichuan)  
     *Dicerapanorpa magna* (Chou in Chou *et al.*, 1981) (Shaanxi)  
     *Dicerapanorpa shennongensis* Zhong & Hua, 2013 (Hubei)  
     *Dicerapanorpa stotzneri* (Esben-Petersen, 1934) (Sichuan)  
     *Dicerapanorpa tjederi* (Carpenter, 1938) (Sichuan)  
     *Dicerapanorpa triclada* (Qian & Zhou, 2001) (Yunnan, Sichuan)  
*Furcatopanorpa* Ma & Hua, 2011  
     *Furcatopanorpa longihypovalva* (Hua & Cai, 2009) (Shaanxi, Gansu, Hubei)  
*Neopanorpa* Weele, 1909  
     *Neopanorpa abstrusa* Zhou & Wu in Zhou *et al.*, 1993a (Zhejiang)  
     *Neopanorpa anchoroides* Zhou, 2003 (Guizhou)  
     *Neopanorpa apicata* Navás, 1922 (Guizhou)  
     *Neopanorpa auriculata* Zhou, 2005 (Guizhou)  
     *Neopanorpa banksi* Carpenter, 1938 (Sichuan)  
     *Neopanorpa brevivalvae* Chou & Wang in Chou *et al.*, 1988 (Hunan, Guangdong)  
     *Neopanorpa brisi* (Navás, 1930) (Yunnan)  
         syn. *Neopanorpa pilosa* Carpenter, 1945, synonymized by Byers, 1970  
     *Neopanorpa cangshanensis* Zhou, 2006 (Guizhou)  
     *Neopanorpa cantonensis* Cheng, 1957 (Guangdong)  
     *Neopanorpa carpenteri* Cheng, 1957 (Guangdong)  
     *Neopanorpa cavaleriei* (Navás, 1908) (Guizhou)  
     *Neopanorpa caveata* Cheng, 1957 (Fujian)  
     *Neopanorpa chaohsiufui*, **nom. nov.** (Guizhou)  
         = *Neopanorpa chaoi* Zhou, 2003, preoccupied by *N. chaoi* Cheng, 1957  
     *Neopanorpa chaoi* Cheng, 1957 (Fujian)  
         hom. *Neopanorpa chaoi* Zhou, 2003, **hom. nov.**  
     *Neopanorpa chelata* Carpenter, 1938 (Sichuan)  
     *Neopanorpa chillcotti* Byers, 1971 (Tibet; Nepal)

- Neopanorpa choui* Cheng, 1949 (Sichuan)  
*Neopanorpa circularis* Ju & Zhou, 2003 (Zhejiang)  
*Neopanorpa clara* Chou & Wang in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa claripennis* Carpenter, 1938 (Sichuan)  
*Neopanorpa curva* Zhou, 2000 (Yunnan)  
*Neopanorpa cuspidata* Byers, 1965, **new record to China** (Yunnan; Thailand)  
*Neopanorpa dimidiata* Navás, 1930 (Yunnan)  
*Neopanorpa dispar* Issiki & Cheng, 1947 (Taiwan)  
*Neopanorpa dubis* Chou & Wang in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa fangxianga* Zhou & Zhou, 2007 (Guizhou)  
*Neopanorpa formosana* (Navás, 1911) (Taiwan)  
*Neopanorpa formosensis* Navás, 1930 (Taiwan)  
*Neopanorpa furcata* Zhou, 2005 (Guizhou)  
*Neopanorpa gradana* Cheng, 1952 (Taiwan)  
*Neopanorpa gulinensis* Zhou & Zhou, 2005 (Guizhou)  
*Neopanorpa hainanica* Hua & Chou, 1998 (Hainan)  
*Neopanorpa harmandi* (Navás, 1908) (Yunnan; Thailand)  
    syn. *Neopanorpa harmandi conjuncta* Navás, 1930, synonymized by Byers, 1965  
*Neopanorpa hei* Zhou & Fang, 1998 (Zhejiang)  
*Neopanorpa heii* Cheng, 1949 (Sichuan)  
*Neopanorpa hualizhongii* Hua & Chou, 1998 (Hainan, Guangdong, Guangxi)  
*Neopanorpa huangshana* Cheng, 1957 (Anhui)  
*Neopanorpa hunanensis* Hua, 2002 (Hunan, Guangxi, Guangdong, Guizhou)  
    = *Neopanorpa magna* Chou & Wang in Chou *et al.*, 1988, preoccupied by *N. magna*  
    Issiki, 1927  
*Neopanorpa hushengchangii* Hua & Chou, 1999 (Tibet)  
*Neopanorpa jigongshanensis* Hua, 1998 (Henan)  
*Neopanorpa jiulongensis* Zhou in Zhou *et al.*, 1993b (Zhejiang)  
*Neopanorpa k-maculata* Cheng, 1952 (Taiwan)  
*Neopanorpa kwangtsehi* Cheng, 1957 (Fujian)  
*Neopanorpa lacunaris* Navás, 1930 (Yunnan)  
*Neopanorpa latipennis* Cheng, 1949 (Sichuan)  
*Neopanorpa leigongshana* Zhou & Zhou, 2007 (Guizhou)  
*Neopanorpa lichuanensis* Cheng, 1957 (Hubei)  
*Neopanorpa lifashengi* Hua & Chou, 1999 (Tibet)  
*Neopanorpa linjiangensis* Zhou, 2005 (Guizhou)  
*Neopanorpa lipingensis* Cai & Hua, 2009 (Shaanxi)  
*Neopanorpa longiprocessa* Hua & Chou, 1997 (Henan, Shaanxi, Hubei)  
*Neopanorpa lui* Chou & Ran in Chou *et al.*, 1981 (Shaanxi, Gansu)  
*Neopanorpa lungtausana* Cheng, 1957 (Guangdong)  
*Neopanorpa maai* Cheng, 1957 (Fujian)  
*Neopanorpa magna* Issiki, 1927 (Taiwan)  
    hom. *Neopanorpa magna* Chou & Wang in Chou *et al.*, 1988  
*Neopanorpa makii* Issiki, 1927 (Taiwan)

- Neopanorpa mangshanensis* Chou & Wang in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa maolanensis* Zhou & Bao, 2002 (Guizhou)  
*Neopanorpa mayangensis* Zhou & Zhou, 2010 (Guizhou)  
*Neopanorpa menghaiensis* Zhou & Wu in Zhou *et al.*, 1993a (Yunnan)  
*Neopanorpa minuta* Chou & Wang in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa moganshanensis* Zhou & Wu in Zhou *et al.*, 1993a (Zhejiang)  
*Neopanorpa mokansana* Cheng, 1957 (Zhejiang)  
*Neopanorpa montana* Zhou in Zhou *et al.*, 1993b (Zhejiang)  
*Neopanorpa mutabilis* Cheng, 1957 (Fujian)  
*Neopanorpa nielsenii* Byers, 1965, **new record to China** (Yunnan; Vietnam)  
*Neopanorpa nigrilis* Carpenter, 1938 (Sichuan)  
*Neopanorpa ophthalmica* (Navás, 1911) (Taiwan, Zhejiang)  
*Neopanorpa ovata* Cheng, 1957 (Fujian)  
*Neopanorpa parva* Carpenter, 1945 (Sichuan)  
*Neopanorpa pallivalva* Zhou, 2003 (Guizhou)  
*Neopanorpa pendula* Qian & Zhou, 2001 (Yunnan)  
*Neopanorpa pielina* Navás, 1936 (Jiangxi)  
*Neopanorpa pulchra* Carpenter, 1945 (Guizhou, Hainan, Guangxi, Yunnan)  
*Neopanorpa puripennis* Chou & Wang in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa retina* Chou & Li in Chou *et al.*, 1988 (Hunan)  
*Neopanorpa sauteri* (Esben-Petersen, 1912) (Taiwan)  
*Neopanorpa sheni* Hua & Chou, 1997 (Henan, Shaanxi)  
*Neopanorpa siamensis* Byers, 1965 (Yunnan; Thailand)  
*Neopanorpa simulans* Byers, 2008 (Taiwan)  
     = *Neopanorpa similis* Byers, 2002, preoccupied by *N. similis* Byers, 1999  
*Neopanorpa taoi* Cheng, 1949 (Sichuan)  
*Neopanorpa tengchongensis* Zhou & Wu in Zhou *et al.*, 1993a (Yunnan)  
*Neopanorpa tenuis* Zhou, 2000 (Yunnan)  
*Neopanorpa tibetensis* Hua & Chou, 1999 (Tibet)  
*Neopanorpa tienmushana* Cheng, 1957 (Zhejiang)  
*Neopanorpa tienpingshana* Chou & Wang in Chou *et al.*, 1988 (Hunan, Hubei)  
*Neopanorpa translucida* Cheng, 1957 (Fujian)  
*Neopanorpa uncata* Zhou, 2000 (Yunnan)  
*Neopanorpa uncinella* Qian & Zhou, 2001 (Yunnan)  
*Neopanorpa validipennis* Cheng, 1949 (Sichuan)  
*Neopanorpa varia* Cheng, 1949 (Sichuan)  
*Neopanorpa wangcaensis* Zhou & Zhou, 2012 (Guizhou)  
*Neopanorpa xishuiensis* Zhou, 2005 (Guizhou)  
*Neopanorpa yingjiangensis* Zhou, 2000 (Yunnan)  
*Neopanorpa youngi* Byers, 1994 (Taiwan)  
*Panorpa* Linnaeus, 1758  
     *Panorpa acanthophylla* Zhou, 2006 (Guizhou)  
     *Panorpa akasakai* Issiki, 1929 (Taiwan)  
     *Panorpa alata* Zhou & Zhou, 2005 (Guizhou)

- Panorpa anfracta* Ju & Zhou, 2003 (Zhejiang)  
*Panorpa angustistriata* Issiki, 1929 (Taiwan)  
*Panorpa anrenensis* Chou & Wang in Chou *et al.*, 1987 (Hunan, Guangxi)  
*Panorpa apiconebulosa* Issiki, 1929 (Taiwan)  
*Panorpa aurea* Cheng, 1957 (Fujian, Zhejiang)  
*Panorpa baohwashana* Cheng, 1957 (Jiangsu)  
*Panorpa biclada* Zhang & Hua, 2012 (Shaanxi, Hubei)  
*Panorpa bifasciata* Chou & Wang in Chou *et al.*, 1981 (Henan, Shaanxi, Gansu, Hubei)  
*Panorpa bistriata* Issiki, 1929 (Taiwan)  
*Panorpa brevititilana* Issiki, 1929 (Taiwan)  
*Panorpa bunun* Issiki, 1929 (Taiwan)  
*Panorpa carpenteri* Cheng, 1957 (Sichuan)  
*Panorpa changbaishana* Hua in Hou & Hua, 2008 (Jilin, Liaoning)  
= *Panorpa choui* Hua, 1998, preoccupied by *P. choui* Zhou, 1993a  
*Panorpa chengi* Chou in Chou *et al.*, 1981 (Shaanxi, Gansu)  
*Panorpa cheni* Cheng, 1957 (Zhejiang)  
*Panorpa choui* Zhou & Wu in Zhou *et al.*, 1993a (Zhejiang)  
hom. *Panorpa choui* Hua, 1998  
*Panorpa cladocerca* Navás, 1935 (Jiangxi)  
*Panorpa concolor* Esben-Petersen, 1915 (Taiwan)  
*Panorpa coomani* Cheng, 1957 (Jiangxi)  
*Panorpa curva* Carpenter, 1938 (Sichuan, Shaanxi, Gansu)  
*Panorpa curvata* Zhou, 2006 (Guizhou)  
*Panorpa dashahensis* Zhou & Zhou, 2005 (Guizhou)  
*Panorpa davidi* Navás, 1908 (Sichuan)  
*Panorpa deceptor* Esben-Petersen, 1913 (Taiwan)  
*Panorpa decolorata* Chou & Wang in Chou *et al.*, 1981 (Shaanxi, Henan, Hubei, Gansu)  
*Panorpa difficilis* Carpenter, 1938 (Sichuan)  
*Panorpa esakii* Issiki, 1929 (Taiwan)  
*Panorpa emeishana* Hua, Sun & Li, 2001  
*Panorpa falsa* Issiki & Cheng, 1947 (Taiwan)  
*Panorpa filina* Chou & Wang in Chou *et al.*, 1987 (Hunan)  
*Panorpa flavicorporis* Cheng, 1957 (Fujian)  
*Panorpa flavipennis* Carpenter, 1938 (Sichuan)  
*Panorpa fructa* Cheng, 1949 (Sichuan)  
*Panorpa fukiensis* Tjeder, 1950 (Fujian)  
*Panorpa fulvastra* Chou in Chou *et al.*, 1981 (Shaanxi)  
*Panorpa furcata* Zhou & Zhou, 2007 (Guizhou)  
*Panorpa grahamana* Cheng, 1957 (Sichuan)  
*Panorpa gressitti* Byers, 1970 (Guangdong)  
*Panorpa guidongensis* Chou & Li in Chou *et al.*, 1987 (Hunan)  
*Panorpa guttata* Navás, 1908 (Sichuan)  
*Panorpa hamata* Issiki & Cheng, 1947 (Taiwan)  
*Panorpa implicata* Cheng, 1957 (Fujian)

- Panorpa insularis* Hua & Chou, 1998 (Hainan)  
*Panorpa issikiana* Byers, 1970 (Yunnan)  
*Panorpa issikii* Penny & Byers, 1979 (Taiwan)  
     = *Panorpa acuta* Issiki & Cheng, 1947, preoccupied by *P. acuta* Carpenter, 1931  
*Panorpa jilinensis* Zhou, 2000 (Jilin, Liaoning)  
*Panorpa jinchuana* Hua, Sun & Li, 2001 (Sichuan)  
*Panorpa kellogi* Cheng, 1957 (Fujian)  
*Panorpa kiautai* Zhou & Wu in Zhou *et al.*, 1993a (Zhejiang)  
*Panorpa klapperichi* Tjeder, 1950 (Fujian)  
*Panorpa kunmingensis* Fu & Hua, 2009 (Yunnan)  
*Panorpa lachlani* Navás, 1930 (Taiwan)  
*Panorpa liaoi* Zhou & Zhou, 2007 (Guizhou, Chongqing)  
     *Panorpa liaoe* Zhou & Zhou, 2007  
*Panorpa lintienschana* Cheng, 1952 (Taiwan)  
*Panorpa liui* Hua, 1997 (Liaoning, Jilin, Heilongjiang, Inner Mongolia)  
*Panorpa longiramina* Issiki & Cheng, 1947 (Taiwan)  
*Panorpa longititilana* Issiki, 1929 (Taiwan)  
*Panorpa lutea* Carpenter, 1945 (Anhui)  
*Panorpa macrostyla* Hua, 1998 (Liaoning, Jilin)  
*Panorpa mangshanensis* Chou & Wang in Chou *et al.*, 1987 (Hunan)  
*Panorpa mokansana* Cheng, 1957 (Zhejiang)  
*Panorpa neospinosa* Chou & Wang in Chou *et al.*, 1981 (Shaanxi)  
*Panorpa nokoensis* Issiki, 1929 (Taiwan)  
*Panorpa nudiramus* Byers, 2002 (Taiwan)  
*Panorpa obliqua* Carpenter, 1945 (Jiangxi)  
*Panorpa obliquifascia* Chou & Wang in Chou *et al.*, 1987 (Hunan; Guangdong)  
*Panorpa ochraceocauda* Issiki, 1927 (Taiwan)  
*Panorpa pallidimaculata* Issiki, 1929 (Taiwan)  
*Panorpa parallela* Wang & Hua, 2016 (Yunnan)  
*Panorpa pectinata* Issiki, 1929 (Taiwan)  
*Panorpa peterseana* Issiki, 1927 (Taiwan)  
*Panorpaieli* Cheng, 1957 (Jiangxi)  
*Panorpa pingjiangensis* Chou & Wang in Chou *et al.*, 1987 (Hunan)  
*Panorpa pusilla* Cheng, 1949 (Shaanxi)  
*Panorpa qiana* Zhou & Zhou, 2010 (Guizhou)  
*Panorpa qinlingensis* Chou & Ran in Chou *et al.*, 1981 (Shaanxi)  
*Panorpa quadrifasciata* Chou & Wang in Chou *et al.*, 1987 (Hunan, Hubei)  
*Panorpa rantaisanensis* Issiki, 1929 (Taiwan)  
*Panorpa reflexa* Wang & Hua, 2016 (Yunnan)  
*Panorpa semifasciata* Cheng, 1949 (Sichuan)  
*Panorpa sexspinosa* Cheng, 1949 (Shaanxi, Henan, Hubei, Gansu)  
     *Panorpa sexspinosa zhongnanensis* Chou & Ran in Chou *et al.*, 1981  
*Panorpa sextaenia* Zhou & Bao, 2002 (Guizhou, Guangxi)  
*Panorpa shanyangensis* Chou & Wang in Chou *et al.*, 1981 (Shaanxi)



- Panorpa shibatai* Issiki, 1929 (Taiwan)  
*Panorpa sonani* Issiki, 1929 (Taiwan)  
*Panorpa songes* Zhou & Zhou, 2005 (Guizhou)  
*Panorpa stigmatis* Navás, 1908 (Sichuan)  
*Panorpa stigmata* Zhou, 2006 (Guizhou)  
*Panorpa subambra* Chou & Tong in Chou *et al.*, 1987 (Hunan)  
*Panorpa subaurea* Chou & Li in Chou *et al.*, 1987 (Hunan, Zhejiang)  
*Panorpa taiheisanensis* Issiki, 1929 (Taiwan)  
*Panorpa taiwanensis* Issiki, 1929 (Taiwan)  
*Panorpa tecta* Byers, 2002 (Taiwan)  
*Panorpa tetrazonia* Navás, 1935 (Anhui, Jiangxi)  
*Panorpa trifasciata* Cheng, 1957 (Fujian)  
*Panorpa tritaenia* Chou & Wang in Chou *et al.*, 1987 (Hunan)  
*Panorpa typicoides* Cheng, 1949 (Sichuan)  
*Panorpa waongkehzengi* Navás, 1935 (Jiangxi)  
*Panorpa wrightae* Cheng, 1957 (Zhejiang)  
*Panorpa yangi* Chou in Chou *et al.*, 1981 (Shaanxi)  
*Panorpa yiei* Issiki & Cheng, 1947 (Taiwan)  
*Sinopanorpa* Cai & Hua in Cai *et al.*, 2008  
*Sinopanorpa digitiformis* Huang & Hua in Cai *et al.*, 2008 (Hubei)  
*Sinopanorpa nangongshana* Cai & Hua in Cai *et al.*, 2008 (Shaanxi)  
*Sinopanorpa tinctoria* (Navás, 1931) (Shaanxi, Gansu, Sichuan)  
 syn. *Panorpa statura* Cheng, 1949, synonymized by Hua & Peng, 2005

### Family Panorpodidae

*Panorpodes* MacLachlan, 1875

- Panorpodes brachypodus* Tan & Hua, 2008 (Chongqing)  
*Panorpodes brevicaudatus* (Hua, 1998) (Jilin)  
*Panorpodes kuandianensis* Zhong, Zhang & Hua, 2011 (Liaoning)

Remarks. Although *Panorpa liaoi* Zhou & Zhou, 2007 bears a feminine specific name (*liaoe*) in the original description, the authors clearly stated that the species was named after the collector, Mr. Qirong LIAO. Therefore, the specific name should have a masculine ending, *-i*.

#### 1. *Bicaubittacus burmanus* (Tjeder, 1973) (Fig. 1A), new record to China

*Bittacus burmanus* Tjeder, 1973: 188, figs. 1–13; Tan & Hua, 2009: 37.

**Specimens examined.** 1♂7♀, **China**, Yunnan, Mt. Tanglishan (24°01'34"N, 99°13'48"E, 1800–2000 m), Yongde County, 12-VII-2016, leg. Jishen WANG & Yuan HUA (NWAU).

Revised diagnosis. This species can be readily recognized by the male gonocoxites with two long curved distal prolongations, and epandrial appendages forked apically into a pair of slender prongs.

Distribution. Yunnan (Yongde); Myanmar (Kambaiti).

#### 2. *Bittacus monastyrskiyi* Bicha, 2007 (Fig. 2A), new record to China

*Bittacus monastyrskiyi* Bicha, 2007: 333, figs. 1–5; Somma, 2009: 1; Bicha, 2010: 67.

**Specimens examined.** 1♂, **China**, Guangxi, Laohutiao (light trap), Nianjing Village, Napo County, 30-VII-2008, leg. Liusheng CHEN (NWAU).

Revised diagnosis. The species is similar to *Bittacus trapezoideus* Huang & Hua, 2005 in wing markings and body coloration, but it can be differentiated from the latter species by male epandrial appendages split apically into one short and one long digitate lobe (*cf.* epandrial appendages are trapezoidal and simple).

Distribution. Guangxi (Napo); Vietnam (Thanh Hoa, Há Tay).



Figure 1. A. *Bicaubittacus burmanus* (Tjeder, 1973), male; B. *Neopanorpa nielsenii* Byers, 1965, male.

3. *Neopanorpa nielsenii* Byers, 1965 (Fig. 1B), new record to China

*Neopanorpa nielsenii* Byers, 1965: 723, figs. 54–59.

**Specimens examined.** 3♂3♀, **China**, Yunnan, Mt. Tangli (24°01'34"N, 99°13'48"E, 1800–2000 m), Yongde County, 24–28-VIII-2014, leg. Jishen WANG (NWAU); 15♂12♀, same locality, 18–24-VIII-2015, leg. Jishen WANG (NWAU).

Revised diagnosis. This species is similar to *Neopanorpa cavaleriei* (Navás, 1908) in gross morphology, but it can be differentiated from the latter species by its slender genital bulb and gonostyli (*cf.* genital bulb and gonostyli are thicker).

Distribution. Yunnan (Yongde); Vietnam (Tonkin).

4. *Neopanorpa cuspidata* Byers, 1965 (Fig. 2B), new record to China

*Neopanorpa cuspidata* Byers, 1965: 720, figs. 43–48.

**Specimens examined.** 1♂, **China**, Yunnan, Menglong (650 m), Xishuangbanna, 18-VI-1958, leg. Hanhua CHENG; 1♀, **China**, Yunnan, Mengwang (800 m), Xishuangbanna, 01-VI-1958, leg. Hanhua CHENG; 2♂, **China**, Yunnan, Nabanhe Nature Reserve, Xishuangbanna, 10-VI-2013, leg. Pia OREMEK (IZAS).

Revised diagnosis. This species can be recognized by the acuminate, non-overlapped hypovalves in male genitalia.

Distribution. Yunnan (Xishuangbanna); Thailand (Tak, Kanchanaburi, Chanthaburi, *etc.*)



Figure 2. A. *Bittacus monasteryskiya* Bicha, 2007, male; B. *Neopanorpa cuspidata* Byers, 1965, male. Scale bars = 5.0 mm.

### 5. *Panorpa guttata* Navás, 1908 (Figs. 3–6)

*Panorpa guttata* Navás, 1908: 416; Esben-Petersen, 1921: 32, fig. 32; Cheng, 1957: 59; Rust & Byers, 1976: 86, figs. 157–159.

**Specimens examined.** 2♂8♀, **China**, Sichuan, Mt. Emei (1300–3200 m), 19–30-VIII-1957, leg. Fuxing ZHU, Keren HUANG & Youcai LU (IZAS); 1♀, **China**, Sichuan, Wolong (1900 m), 12-VIII-1989 (IZAS); 2♂2♀, **China**, Sichuan, Wolong (1900 m), 28-VII-04-VIII-2003, leg. Tao PENG (NWAU); 4♂10♀, **China**, Sichuan, Wolong (1900 m), 30-VII-2008, leg. Qiang FU & Gang YAN (NWAU); 1♂, **China**, Sichuan, Xixiangchi (29°33'28"N, 103°20'36"E, 2000 m), Mt. Emei, 26-VII-2008, leg. Qiang FU & Gang YAN (NWAU); 1♂, **China**, Sichuan, Xiling Snow Mountain (30°42'4"N, 103°11'27"E, 2100 m), 29-VII-2015, leg. Rixin JIANG (NWAU); 8♂10♀, **China**, Sichuan, Anzihe Nature Reserve (30°47'21"N, 103°10'37"E, 2000 m), 01–30-VI-2016, leg. Kaiwen GAO (NWAU); 5♂7♀, **China**, Sichuan, Gongyihai (29°02'49"N, 102°21'40"E, 1800 m), Shimian County, 25-VII-2016, leg. Lu JIANG (NWAU); 1♀, **China**, Sichuan, Fengtongzhai (30°35'25"N, 102°52'20"E, 2000 m), Baoxing County, 30-VII-2016, leg. Lu JIANG (NWAU).

**Revised diagnosis.** This species can be recognized by the following features: 1) wings with spot-like, greatly reduced apical and pterostigmal bands; 2) posterior margin of male A6 with a deep mesal emargination dorsally and a pair of teeth laterally; 3) inner portion of basal half of gonostylus with dozens of long bristles; 4) female genital plate with a broad, oblong basal plate.

**Male.** Head (Fig. 3C). Vertex yellow. A round blackish spot enclosing ocellar triangle. Rostrum yellow with deepened lateral edges. Labrum yellowish brown. Maxillary and labial palps faint yellow and deepened toward apices. Scape yellow, pedicel and flagellum dark brown. Flagellomeres 39–42.

**Thorax** (Fig. 3D). Pronotum yellowish, with 8–10 stout setae along its anterior margin. Meso- and metanotum yellowish brown, with a broad pale yellow mesal stripe. Pleura and legs light yellowish brown.

**Wings** (Fig. 3A). Forewing length  $11.2 \pm 0.50$  mm, width  $2.3 \pm 0.04$  mm, narrow, with

greatly reduced, spot-like pterostigmal band, membrane hyaline with a faint yellowish tinge. Longitudinal veins and basal cross veins brown, apical cross veins hyaline. Pterostigma yellow. Hindwing length  $10.1 \pm 0.46$  mm, width  $2.2 \pm 0.04$  mm, similar to forewings in general pattern and colorations.

Venation (Fig. 3A).  $R_1$  extending into pterostigma.  $R_2$  bifurcated. 1A ending far beyond the level of the origin of  $R_s$ . Two cross veins between 1A and 2A.

Abdomen (Figs. 3E–H). T1–T3 pale anteriorly and yellowish posteriorly. T4 and T5 yellow. Notal organ of T3 slightly protruded, bears dense black setae, slightly notched mesally at apex, not exceeding the pointed postnotal organ of T4. A6 narrow basally, slightly enlarged toward apex, posterodorsal margin with a deep mesal emargination, then forming two dorsal lobes; postero-lateral portion with a pair of acute teeth; lateral margin with a U-shaped emargination between the tooth and the dorsal lobe. A7 sub-cylindrical, distal portion raised dorsad. A8 slightly shorter than A7, constricted basally and beveled terminally.

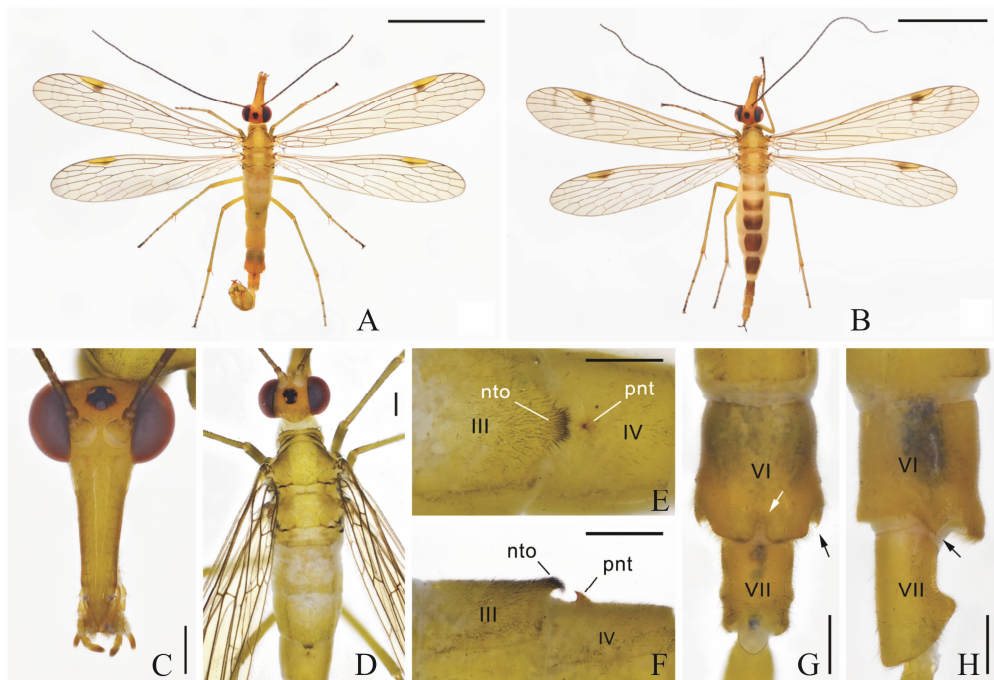


Figure 3. *Panorpa guttata* Navás, 1908. A. Habitus of male; B. Habitus of female; C. Male head, frontal view; D. Male dorsum; E and F. Male notal and postnotal organs, dorsal and lateral views; G and H. Male A6 and A7, dorsal and lateral views. White arrow in G shows the dorsal emargination, black arrows in G and H show the lateral teeth. nto, notal organ; pnt, postnotal organ. Scale bars = 5.0 mm (Figs. 3A, B); 0.5 mm (Figs. 3C–H).

Male genitalia (Figs. 4, 5). Genital bulb yellowish brown, long elliptical. Epandrium (T9) broad basally, tapering towards apex and constricted at distal third, with a deep U-shaped emargination terminally, exceeding to the subbasal process of gonostylus. Hypandrium (S9) with a broad basal stalk and splits into paired hypovalves, slightly shorter than gonocoxite. Hypovalve with an obtuse angle at inner margin, distal half slightly twisted. Gonocoxite with 5–8 stout setae at its ventral apex. Gonostylus yellowish brown at basal half and brown at

distal half, concaved along outer margin, with a blunt median tooth and a broad subbasal process; inner portion of basal half with dozens of long, curved bristles. Paramere bifurcated at basal two-fifths, with a long ventral branch extending to the level of the apex of aedeagus, and a shorter dorsal branch; both branches slender, bear dense setae on their distal portions. Aedeagus with membranous ventral valves and elongated, sclerotized dorsal valves; dorsal valve neck-like at middle, distal portions swollen and exceeding to the level of the base of gonostylus; two dorsal valves fused at base and forming an oval space mesally; lateral processes prominent.



Figure 4. Genital bulb of male *Panorpa guttata* Navás, 1908. A–C. Ventral, lateral, and dorsal views. ae, aedeagus; bst, basal stalk of hypandrium; ce, cercus; ep, epandrium; gcx, gonocoxite; gs, gonostylus; hv, hypovalve; pm, paramere. Scale bars = 0.5 mm.

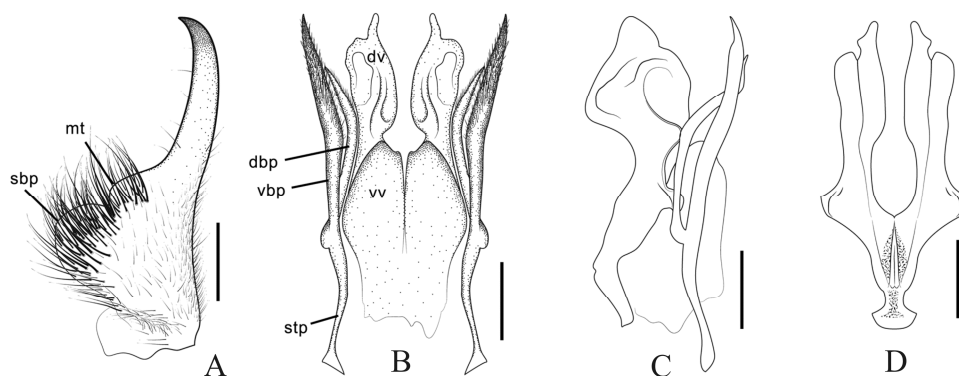


Figure 5. Male gonostylus and aedeagal complex of *Panorpa guttata* Navás, 1908. A. Gonostylus, ventral view; B and C. Aedeagal complex, ventral and lateral views; D. Dorsal aedeagal valves, dorsal view. dbp, dorsal branch of paramere; dv, dorsal aedeagal valve; mt, median tooth of gonostylus; sbp, subbasal process of gonostylus; stp, stalk of paramere; vbp, ventral branch of paramere; vv, ventral aedeagal valve. Scale bars = 0.2 mm.



Female. General appearance similar to males, except terga darker (Fig. 3B). Forewing length  $11.5 \pm 0.34$  mm, width  $2.7 \pm 0.53$  mm, with greatly reduced apical and pterostigmal bands. Hindwing length  $10.3 \pm 0.42$  mm, width  $2.6 \pm 0.28$  mm.

Female genitalia (Fig. 6). Subgenital plate oblong, setose, with rather longer setae along margin. Genital plate with a slightly sclerotized basal plate; main plate narrowing cephalad and expanding caudad; axis slightly longer than twice the length of main plate, anterior apodemes widely divergent and connected by a slightly sclerotized lamella; posterior arms very short, parallel.

Distribution. Sichuan (Baoxing, Shimian, Anzihe, Mt. Emei, Xiling Snow Mountain, Wolong).

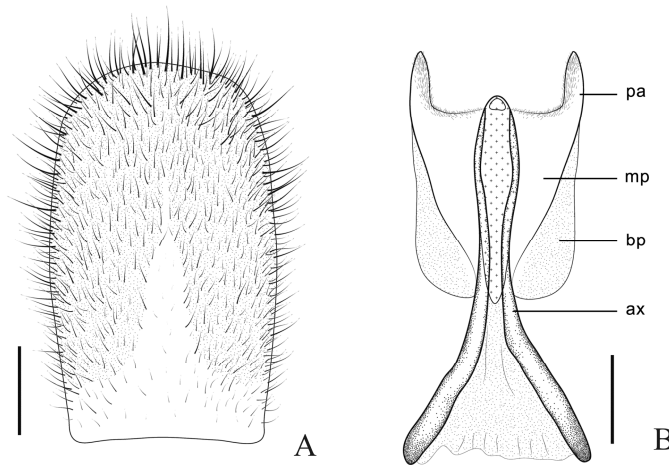


Figure 6. Female genitalia of *Panorpa guttata* Navás, 1908. A. Subgenital plate, ventral view; B. Genital plate, ventral view. ax, axis; bp, basal plate; mp, main plate; pa, posterior arm. Scale bars = 0.2 mm.

Remarks. This species is previously known only by the female holotype, collected by Father Armand David from Mou-pin, Tibet (now Baoxing County, Sichuan). Navás (1908) proposed the name *guttata* for the female of *Panorpa davidi* Navás, 1908, regarding the wings are narrower and have indistinct markings, in addition to paler body color. Esben-Petersen (1915) recognized the female of *P. davidi* as the holotype of *P. guttata*. The female genitalia was later dissected, illustrated and described by Rust & Byers (1976). The specimens exhibit yellowish green body color when alive, but become greyish or yellowish brown after death.

The male of *P. guttata* resembles that of *P. kunmingensis* Fu & Hua, 2009 in emarginated T6, bifurcated paramere and shape of dorsal aedeagal valves. However, male of *P. guttata* has a pair of lateral teeth on A6 (*cf.* absent), and more slender genital bulb (*cf.* relatively stout).

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